



US007183254B2

(12) **United States Patent**  
**DePaoli et al.**

(10) **Patent No.:** **US 7,183,254 B2**  
(45) **Date of Patent:** **Feb. 27, 2007**

(54) **USE OF LEPTIN FOR TREATING HUMAN LIPOATROPHY AND METHOD OF DETERMINING PREDISPOSITION TO SAID TREATMENT**

(75) Inventors: **Alexander M. DePaoli**, Santa Barbara, CA (US); **Simeon I. Taylor**, Skillman, NJ (US); **Elif A. Oral**, Ann Arbor, MI (US); **Abhimanyu Garg**, Dallas, TX (US)

(73) Assignee: **Amgen, Inc.**, Thousand Oaks, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 284 days.

(21) Appl. No.: **10/623,189**

(22) Filed: **Jul. 18, 2003**

(65) **Prior Publication Data**

US 2005/0020496 A1 Jan. 27, 2005

**Related U.S. Application Data**

(63) Continuation of application No. 10/279,129, filed on Oct. 22, 2002, now abandoned.

(60) Provisional application No. 60/336,394, filed on Oct. 22, 2001.

(51) **Int. Cl.**

**A61K 38/00** (2006.01)

**A61K 38/16** (2006.01)

**C07K 14/00** (2006.01)

(52) **U.S. Cl.** ..... **514/12**; 424/184.1; 424/198.1; 530/350

(58) **Field of Classification Search** ..... None  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,521,283 A 5/1996 DiMarchi et al.  
5,525,705 A 6/1996 DiMarchi et al.  
5,532,336 A 7/1996 DiMarchi et al.  
5,552,522 A 9/1996 DiMarchi et al.  
5,552,523 A 9/1996 Basinski et al.  
5,552,524 A 9/1996 Basinski et al.  
5,554,727 A 9/1996 Basinski et al.  
5,559,208 A 9/1996 Basinski et al.  
5,563,243 A 10/1996 DiMarchi et al.  
5,563,244 A 10/1996 DiMarchi et al.  
5,563,245 A 10/1996 DiMarchi et al.  
5,567,678 A 10/1996 DiMarchi et al.  
5,567,803 A 10/1996 Basinski et al.  
5,569,743 A 10/1996 DiMarchi et al.  
5,569,744 A 10/1996 Basinski et al.  
5,574,133 A 11/1996 DiMarchi et al.  
5,580,954 A 12/1996 DiMarchi et al.  
5,594,101 A 1/1997 Becker et al.  
5,594,104 A 1/1997 Basinski et al.  
5,605,886 A 2/1997 Basinski et al.  
5,614,379 A 3/1997 MacKellar  
5,691,309 A 11/1997 Basinski et al.

5,719,266 A 2/1998 DiMarchi et al.  
5,756,461 A \* 5/1998 Stephens ..... 514/12  
5,922,678 A \* 7/1999 Stephens ..... 514/12  
6,258,932 B1 7/2001 Vahlne  
6,899,892 B2 \* 5/2005 Gallaher et al. .... 424/439

**FOREIGN PATENT DOCUMENTS**

EP	725078	1/1996
EP	725079	1/1996
EP	741187	4/1996
EP	745610	4/1996
EP	736599	5/1996
EP	744408	5/1996
EP	835879	10/1997
WO	WO 96/05309	2/1996
WO	WO 96/22308	7/1996
WO	WO 96/27385	7/1996
WO	WO 96/23513	8/1996
WO	WO 96/23514	8/1996
WO	WO 96/23515	8/1996
WO	WO 96/23516	8/1996
WO	WO 96/23517	8/1996
WO	WO 96/23518	8/1996
WO	WO 96/23519	8/1996
WO	WO 96/31526	10/1996
WO	WO 96/34111	11/1996
WO	WO 96/34885	11/1996
WO	WO 96/35787	11/1996
WO	WO 96/37517	11/1996

(Continued)

**OTHER PUBLICATIONS**

Gavrilova et al., Leptin and diabetes in lipoatrophic mice, NATURE, Vo. 403, Feb. 24, 2000, pp. 850-851.\*

(Continued)

*Primary Examiner*—Eileen B. O'Hara

(74) *Attorney, Agent, or Firm*—Amylin Pharmaceuticals, Inc.

(57) **ABSTRACT**

Leptin, leptin analogs, and leptin derivatives are used to treat patients with lipoatrophy. Leptin is effective against conditions of lipoatrophy for both genetic and acquired forms of the disease. A therapeutically effective amount of leptin can be administered in a variety of ways, including subcutaneously and using gene therapy methods. Methods of the present invention contemplate administration of leptin, leptin analogs, and leptin derivatives to patients having a leptin level of approximately 4 ng/ml or less before treatment.

**30 Claims, 6 Drawing Sheets**